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SOLAR OBSERVATIONS

SOLAR AND SKY RADIATION MEASUREMENTS DURING FEBRUARY, 1925

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For a description of instruments and exposures, and an account of the method of obtaining and reducing the measurements, the reader is referred to the REVIEW for January, 1924, **52**: 42 and January, 1925, **53**: 29.

From Table 1 it is seen that solar radiation intensities averaged considerably below normal values for February at all three stations.

Table 2 shows that the total solar and sky radiation received on a horizontal surface averaged below normal at the three stations for which weekly normal values have been determined. The deficiency was especially marked at Madison, Wis.

At Washington, skylight polarization measurements made on five days give a mean of 51 per cent, with a maximum of 58 per cent on the 27th. These values are also below the corresponding averages for February at Washington.

No polarization measurements were obtained at Madison, as the ground was continuously covered with snow.

The data from all the stations unites in showing unusually low atmospheric transmission of solar radiation. This may have been due in part to low wind velocities, which permitted an unusual accumulation of smoke of local origin to collect over the cities in or near which the various observing stations are located. The high average temperature, and the accompanying high water-vapor content of the atmosphere no doubt also contributed to the diminution of atmospheric transmission.

TABLE 1.—*Solar radiation intensities during February, 1925*

[Gram-calories per minute per square centimeter of normal surface]

Washington, D. C.

Date	8 a.m.	Sun's zenith distance									Noon
		78.7°	75.7°	70.7°	60.0°	0.0°	60.0°	70.7°	75.7°	78.7°	
	75th mer. time	Air mass									Local mean solar time
		A. M.					P. M.				
	e.	5.0	4.0	3.0	2.0	*1.0	2.0	3.0	4.0	5.0	e.
	mm.	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mm.*
Feb. 3	1.52						1.22	0.98			1.88
4	2.26				1.00		0.89				2.62
5	2.87	0.49	0.60	0.78	1.04		1.08	0.91	0.74		3.63
6	4.37	0.58	0.69	0.79	1.03		0.65	0.59			4.75
18	2.26	0.48	0.68	0.95	1.20	1.54	1.21	0.97	0.82	0.69	2.26
19	3.63		0.54	0.73							3.45
20	3.99	0.68	0.81	0.93	1.18		1.18	0.95			2.74
26	3.99			1.16			1.31				1.24
27	1.12			0.91	1.16		1.24	1.06	0.90	0.77	1.07
28	1.32	0.47	0.62	0.85	1.11	1.37					1.60
Means		0.54	0.66	0.89	1.10		1.10	0.91	0.82	0.73	
Departures		−0.17	−0.15	−0.08	−0.06		−0.08	−0.06	−0.02	−0.03	

TABLE 1.—*Solar radiation intensities during February, 1925*—Con.

Madison, Wis.

Date	8 a.m.	Sun's zenith distance									Noon
		78.7°	75.7°	70.7°	60.0°	0.0°	60.0°	70.7°	75.7°	78.7°	
	75th mer. time	Air mass									Local mean solar time
		A. M.					P. M.				
	e.	5.0	4.0	3.0	2.0	*1.0	2.0	3.0	4.0	5.0	e.
	mm.	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mm.*
Feb. 5	4.57	0.91	1.03	1.20	1.35	1.52	1.34				4.95
6	4.17				1.14		1.10				5.36
13	1.68				1.39		1.41	1.23			1.88
14	1.88		1.02	1.15	1.30	1.47					2.49
17	0.91						1.26				1.60
27	0.51		1.16	1.28	1.45	1.63					1.60
Means		(0.91)	1.07	1.21	1.33		1.28	(1.23)			
Departures		−0.03	−0.05	−0.02	−0.04		−0.08	+0.05			
Lincoln, Nebr.											
Feb. 5	4.37				1.31	1.55	1.31	1.11		0.82	5.79
11	2.26		1.01	1.21	1.42	1.60	1.22	1.07		0.92	2.06
21	3.99		0.81								4.37
23	4.37						1.20				4.75
Means			(0.91)	(1.21)	(1.36)		1.24	(1.09)		(0.87)	
Departures			−0.13	+0.01	−0.03		−0.10	−0.08		−0.04	

* Extrapolated.

TABLE 2.—*Solar and sky radiation received on a horizontal surface*

[Gram-calories per square centimeter of horizontal surface]

Week beginning—	Average daily radiation					Average daily departure from normal		
	Washington	Madison	Lincoln	Chicago	New York	Washington	Madison	Lincoln
	cal.	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*
Jan. 29	200	167	266	104	140	+2	−33	+21
Feb. 5	194	160	227	86	128	−22	−57	−40
12	184	227	312	135	149	−50	−12	+18
19	225	135	255	66	183	−33	−124	−64
Excess or deficiency since first of year on Jan. 25						−1,134	−1,834	−700